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REPORT NO. 655

CONSTRUCTION OF A VESSEL FOR CLEANING GLASSWARE TO BE USED FOR FLUOROMETRIC ASSAYS

(Final Report)

by

Thomas A. Billings, B.S.
David J. Lenzi
and
Walter F. Kocholaty, Ph.D.

4 August 1970

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UNITED STATES ARMY
MEDICAL RESEARCH AND DEVELOPMENT COMMAND

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Fort Knox, Kentucky 40121

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Alteration in Protein Components
of Stored Red Blood Cells
Work Unit No. 162
Combat Surgery
Task No. 00
Combat Surgery
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ABSTRACT

CONSTRUCTION OF A VESSEL FOR CLEANING GLASSWARE
TO BE USED FOR FLUOROMETRIC ASSAYS

OBJECTIVE

To design and construct a vessel for the cleaning of glassware suitable for use in fluorometric assays.

RESULTS AND CONCLUSIONS

A glass vessel was fitted with a large $\bar{5}$ joint-adapter and reflux condenser. This permitted the cleaning of test tubes in boiling nitric acid and confined the corrosive fumes to the apparatus proper, preventing corrosive destruction of the hood interior (i.e., pipes, fans, ductwork, etc.).

CONSTRUCTION OF A VESSEL FOR CLEANING GLASSWARE TO BE USED FOR FLUOROMETRIC ASSAYS

INTRODUCTION

The growing use of fluorometry as an analytical tool is based predominantly on its high specificity and sensitivity by about three orders of magnitude than other photometric techniques, such as colorimetry or spectrophotometry. However, because of the increased sensitivity of the assay method, strict cleanliness of glassware is paramount. Traces of ordinary detergents are fluorescent and traces of chromic acid may absorb sufficient light in the ultraviolet region as to interfere with an assay.

Burch (1) advocated cleaning glassware used for fluorescence assay in half concentrated boiling nitric acid with subsequent rinsing in boiling distilled water and finally in double distilled water. Such extreme care becomes necessary as one approaches the limits of detection of a given fluorescent compound as for instance in the determination of phosphopyridine nucleotides.

The disadvantage of this cleaning process is the corrosive vapors given off, which in time cause extensive damage to the fumehood blowers, ductwork, etc. (hood interior). To prevent this, a glass vessel was fitted with an adapter and condenser which eliminated escape of the vapors by refluxing.

MATERIALS AND METHODS

The apparatus consists of three glass parts: the vessel proper, an adapter, a condenser and two teflon accessories. A cylindrical Pyrex jar 6" X 6" was fused to a S 103/60 female joint (larger joints are available, but the cost becomes prohibitive). The adapter, the corresponding male joint is fitted with a S 34/45 joint into which a Friedricks condenser is inserted. A perforated (1/4" holes spaced 1" apart) teflon disc covering the bottom of the vessel prevents "bumping". The vessel holds about 170 10 X 75 mm test tubes. A two-piece perforated teflon plunger prevents the tubes from floating when filling and emptying the vessel. All operations--cleaning, rinsing and drying--are carried out in the same vessel without touching the glassware.

The original vessel described above has been in almost daily use for almost two years without breakage, a measure of its utility. Since inquiries concerning the construction details of this vessel have been received, a detailed description of the equipment is presented. A vessel of this type could also be useful for cleaning procedures where the escape of noxious or explosive vapors present a hazard.

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[1] Burch, H. B. In: Methods of Enzymology. S. P. Colwick and N. O. Kaplan (Eds.), Vol III, New York: Academic Press, 1957, p. 90.

The drawings in Figure 1 show the front and top views and details of the teflon plunger construction. Figures 2, 3 and 4 are photographs of the apparatus in various stages of assembly.

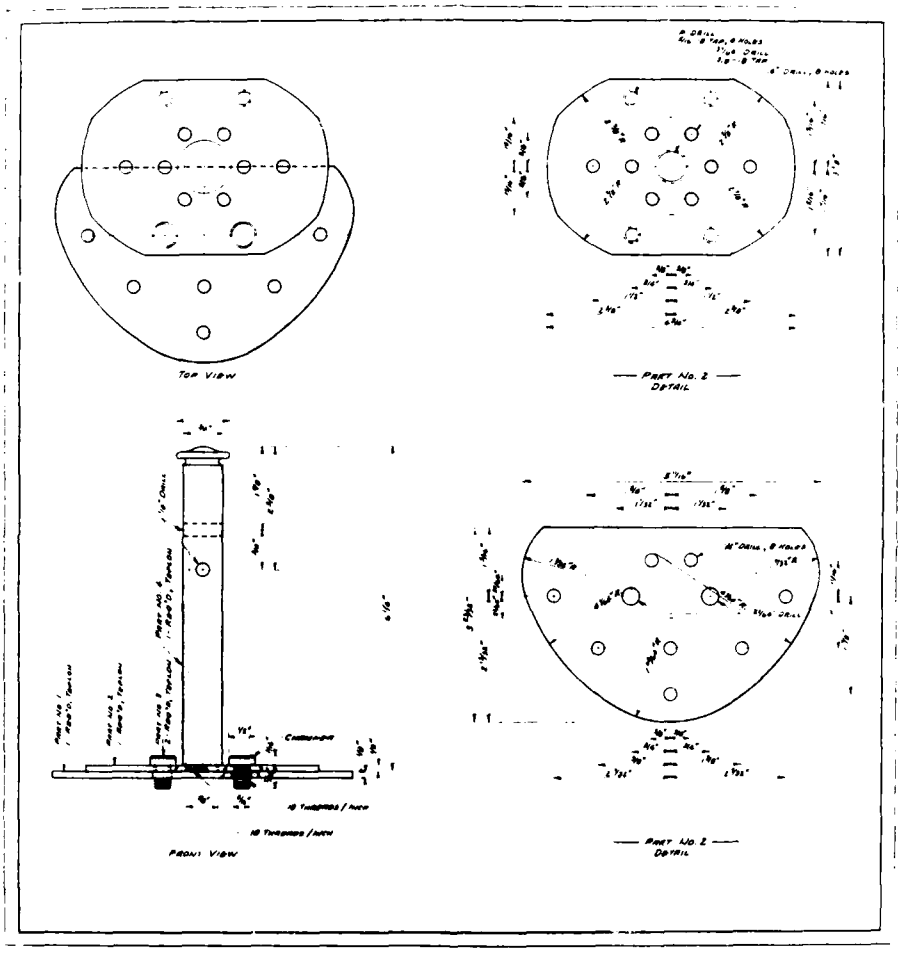

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Fig. 1. Schematics of teflon plunger assembly.

Fig. 2. Apparatus disassembled. Note teflon disc on bottom of glass vessel.

Fig. 3. Apparatus partially assembled with teflon plunger in place.

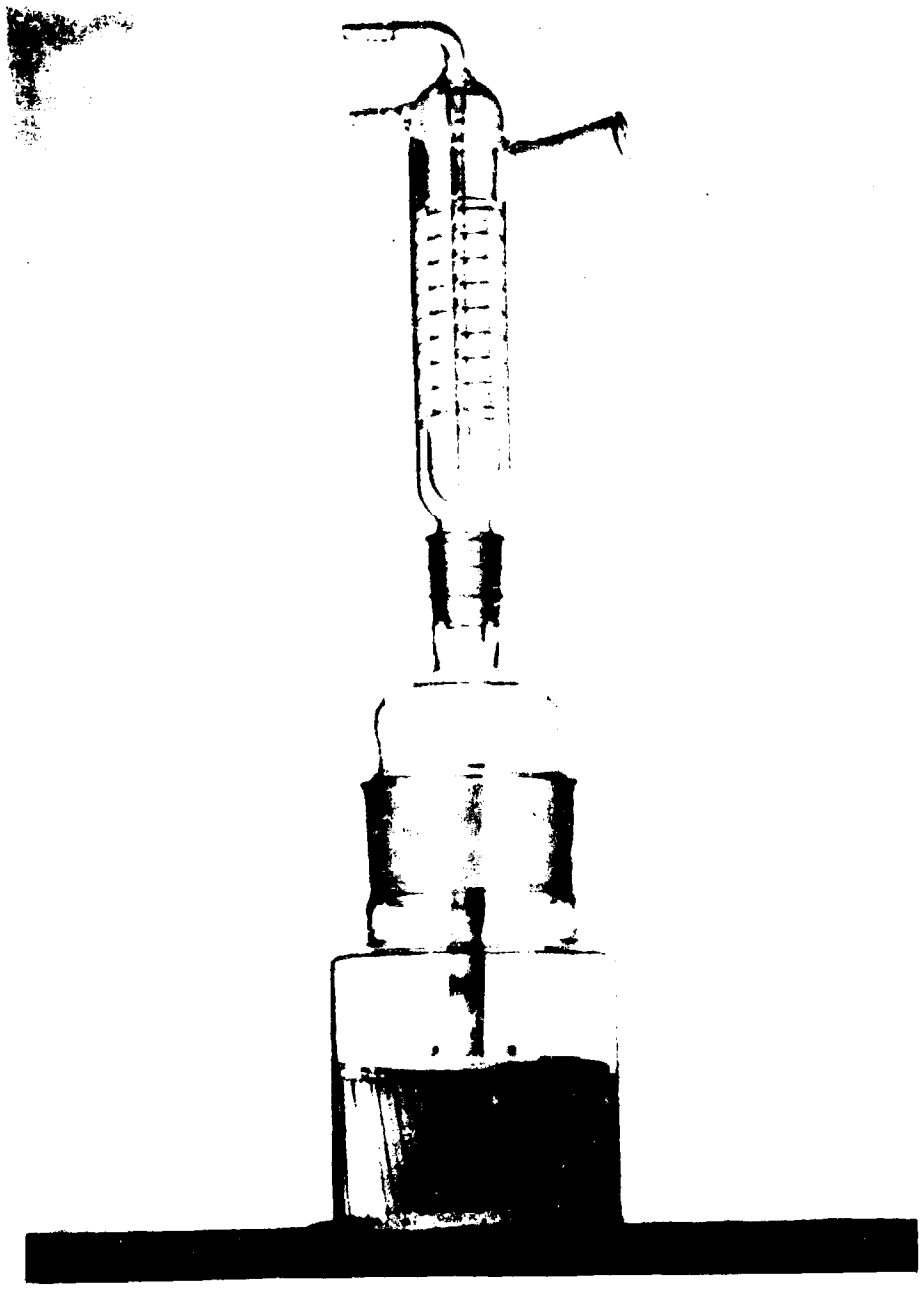

Fig. 4. Completely assembled apparatus.

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